Московский Авиационный Институт

(Национальный Исследовательский Университет)

Институт №8 "Компьютерные науки и прикладная математика"

Кафедра №806 "Вычислительная математика и программирование"

Лабораторная работа №5 по курсу

«Операционные системы»

Группа: М8О-209БВ-24

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Оценка: _____

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Постановка задачи

Цель работы:

Приобретение практических навыков диагностики работы программного обеспечения.

Задание:

При выполнении лабораторных работ по курсу ОС необходимо продемонстрировать ключевые системные вызовы, которые в них используются и то, что их использование соответствует варианту ЛР.

Общий метод и алгоритм решения

Strace — это инструмент для анализа и отладки программ в Linux, который отслеживает все взаимодействия между пользовательскими приложениями и ядром операционной системы. С его помощью можно наблюдать за выполнением системных вызовов, обработкой сигналов и изменениями состояния процессов.

Утилита особенно полезна при диагностике нештатного поведения программ — например, когда они завершаются с ошибкой или работают непредсказуемо. Для этого достаточно запустить нужное приложение под strace, после чего в реальном времени будут выведены все системные вызовы, которые оно выполняет, с детализацией их параметров и возвращаемых значений.

Таким образом, strace позволяет «заглянуть» внутрь работы программы, не модифицируя её исходный код, что делает его незаменимым инструментом как для отладки, так и для изучения принципов взаимодействия приложений с операционной системой.

Основные флаги strace:
- -f - трассировать дочерние процессы
- -e trace= - фильтр по типу вызовов (file, network, process, ipc, signal)
- -o - вывод в файл
- -p - подключиться к работающему процессу
- -c - статистика вместо детального вывода
- -t / -tt / -ttt - временные метки
- -s - ограничение длины строк вывода
- -y - расшифровка файловых дескрипторов

Протокол работы программы

Lab1
```
$ strace -f ./parent
execve("./parent", ["./parent"], 0x7ffd362c8648 /* 36 vars */) = 0
brk(NULL)                    = 0x5609e67bf000
```

```
mmap(NULL, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f3638ce1000
access("/etc/ld.so.preload", R_OK)      = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=19131, ...}) = 0
mmap(NULL, 19131, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f3638cdc000
close(3)                = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) =
3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\243\2\0\0\0\0\0"..., 832) =
832
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64)
= 784
fstat(3, {st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64)
= 784
mmap(NULL, 2170256, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3638aca000
mmap(0x7f3638af2000, 1605632, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000) = 0x7f3638af2000
mmap(0x7f3638c7a000, 323584, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1b0000) = 0x7f3638c7a000
mmap(0x7f3638cc9000, 24576, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1fe000) = 0x7f3638cc9000
mmap(0x7f3638ccf000, 52624, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f3638ccf000
close(3)                    = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f3638ac7000
arch_prctl(ARCH_SET_FS, 0x7f3638ac7740) = 0
set_tid_address(0x7f3638ac7a10)         = 126225
set_robust_list(0x7f3638ac7a20, 24)     = 0
rseq(0x7f3638ac8060, 0x20, 0, 0x53053053) = 0
mprotect(0x7f3638cc9000, 16384, PROT_READ) = 0
mprotect(0x5609cb774000, 4096, PROT_READ) = 0
mprotect(0x7f3638d19000, 8192, PROT_READ) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024,
rlim_max=RLIM64_INFINITY}) = 0
munmap(0x7f3638cdc000, 19131)           = 0
write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265
\320\270\320\274\321\217 \321\204\320\260\320\271\320\273\320\260"..., 49Введите имя
файла для child 1: ) = 49
read(0, f_1.txt
"f_1.txt\n", 255)           = 8
write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265
\320\270\320\274\321\217 \321\204\320\260\320\271\320\273\320\260"..., 49Введите имя
файла для child 2: ) = 49
```

```
read(0, f_2.txt
"f_2.txt\n", 255)            = 8
pipe2([3, 4], 0)                = 0
pipe2([5, 6], 0)                = 0
clone(child_stack=NULL,
flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLDstrace:
Process 126319 attached
    , child_tidptr=0x7f3638ac7a10) = 126319
    [pid 126319] set_robust_list(0x7f3638ac7a20, 24 <unfinished ...>
    [pid 126225] clone(child_stack=NULL,
flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD
<unfinished ...>
    [pid 126319] <... set_robust_list resumed>) = 0
    [pid 126319] close(4strace: Process 126320 attached
    )                = 0
    [pid 126225] <... clone resumed>, child_tidptr=0x7f3638ac7a10) = 126320
    [pid 126320] set_robust_list(0x7f3638ac7a20, 24 <unfinished ...>
    [pid 126225] close(3 <unfinished ...>
    [pid 126319] close(5 <unfinished ...>
    [pid 126225] <... close resumed>)        = 0
    [pid 126320] <... set_robust_list resumed>) = 0
    [pid 126225] close(5 <unfinished ...>
    [pid 126319] <... close resumed>)        = 0
    [pid 126320] close(6 <unfinished ...>
    [pid 126319] close(6 <unfinished ...>
    [pid 126225] <... close resumed>)        = 0
    [pid 126320] <... close resumed>)        = 0
    [pid 126225] write(1,
"\320\240\320\276\320\264\320\270\321\202\320\265\320\273\321\214\321\201\320\272\32
0\270\320\271 \320\277\321\200\320\276\321"..., 56 <unfinished ...>
    Родительский процесс начался
    [pid 126319] <... close resumed>)        = 0
    [pid 126225] <... write resumed>)        = 56
    [pid 126320] close(3 <unfinished ...>
    [pid 126225] write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265
\321\201\321\202\321\200\320\276\321\207\320\272\320\270 \n", 31 <unfinished ...>
    [pid 126319] dup2(3, 0Введите строчки
     <unfinished ...>
    [pid 126225] <... write resumed>)        = 31
    [pid 126320] <... close resumed>)        = 0
    [pid 126225] fstat(0,  <unfinished ...>
    [pid 126319] <... dup2 resumed>)         = 0
    [pid 126225] <... fstat resumed>{st_mode=S_IFCHR|0620, st_rdev=makedev(0x88,
0x6), ...}) = 0
    [pid 126320] close(4 <unfinished ...>
    [pid 126225] getrandom( <unfinished ...>
    [pid 126319] close(3 <unfinished ...>
```

```
[pid 126320] <... close resumed>)        = 0
[pid 126225] <... getrandom resumed>"\x31\x95\x3c\x35\x8a\xaf\x0e\xca", 8,
GRND_NONBLOCK) = 8
[pid 126319] <... close resumed>)        = 0
[pid 126320] dup2(5, 0 <unfinished ...>
[pid 126319] execve("./child_run", ["./child_run", "f_1.txt"], 0x7ffe1c3775b8 /* 36 vars
*/ <unfinished ...>
[pid 126225] brk(NULL <unfinished ...>
[pid 126320] <... dup2 resumed>)         = 0
[pid 126225] <... brk resumed>)          = 0x5609e67bf000
[pid 126320] close(5 <unfinished ...>
[pid 126225] brk(0x5609e67e0000 <unfinished ...>
[pid 126320] <... close resumed>)        = 0
[pid 126225] <... brk resumed>)          = 0x5609e67e0000
[pid 126320] execve("./child_run", ["./child_run", "f_2.txt"], 0x7ffe1c3775b8 /* 36 vars
*/ <unfinished ...>
[pid 126225] read(0, <unfinished ...>
[pid 126320] <... execve resumed>)       = 0
[pid 126319] <... execve resumed>)       = 0
[pid 126320] brk(NULL <unfinished ...>
[pid 126319] brk(NULL <unfinished ...>
[pid 126320] <... brk resumed>)          = 0x556b9a4c3000
[pid 126319] <... brk resumed>)          = 0x555ea04cc000
[pid 126320] mmap(NULL, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fac916dc000
[pid 126319] mmap(NULL, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 126320] access("/etc/ld.so.preload", R_OK <unfinished ...>
[pid 126319] <... mmap resumed>)         = 0x7f7eb66fc000
[pid 126320] <... access resumed>)       = -1 ENOENT (No such file or directory)
[pid 126319] access("/etc/ld.so.preload", R_OK <unfinished ...>
[pid 126320] openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
[pid 126319] <... access resumed>)       = -1 ENOENT (No such file or directory)
[pid 126320] fstat(3, <unfinished ...>
[pid 126319] openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC
<unfinished ...>
[pid 126320] <... fstat resumed>{st_mode=S_IFREG|0644, st_size=19131, ...}) = 0
[pid 126319] <... openat resumed>)       = 3
[pid 126320] mmap(NULL, 19131, PROT_READ, MAP_PRIVATE, 3, 0 <unfinished
...>
[pid 126319] fstat(3, <unfinished ...>
[pid 126320] <... mmap resumed>)         = 0x7fac916d7000
[pid 126319] <... fstat resumed>{st_mode=S_IFREG|0644, st_size=19131, ...}) = 0
[pid 126320] close(3 <unfinished ...>
[pid 126319] mmap(NULL, 19131, PROT_READ, MAP_PRIVATE, 3, 0 <unfinished
...>
[pid 126320] <... close resumed>)        = 0
```

[pid 126319] <... mmap resumed>)   = 0x7f7eb66f7000
[pid 126320] openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6",
O_RDONLY|O_CLOEXEC <unfinished ...>
[pid 126319] close(3 <unfinished ...>
[pid 126320] <... openat resumed>)   = 3
[pid 126319] <... close resumed>)   = 0
[pid 126320] read(3, <unfinished ...>
[pid 126319] openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6",
O_RDONLY|O_CLOEXEC <unfinished ...>
[pid 126320] <... read
resumed>"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\243\2\0\0\0\0\0"..., 832) =
832
[pid 126319] <... openat resumed>)   = 3
[pid 126320] pread64(3, <unfinished ...>
[pid 126319] read(3, <unfinished ...>
[pid 126320] <... pread64
resumed>"\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784
[pid 126319] <... read
resumed>"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\243\2\0\0\0\0\0"..., 832) =
832
[pid 126320] fstat(3, <unfinished ...>
[pid 126319] pread64(3, <unfinished ...>
[pid 126320] <... fstat resumed>{st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0
[pid 126319] <... pread64
resumed>"\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784
[pid 126320] pread64(3, <unfinished ...>
[pid 126319] fstat(3, <unfinished ...>
[pid 126320] <... pread64
resumed>"\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784
[pid 126319] <... fstat resumed>{st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0
[pid 126320] mmap(NULL, 2170256, PROT_READ,
MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fac914c5000
[pid 126319] pread64(3, <unfinished ...>
[pid 126320] mmap(0x7fac914ed000, 1605632, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000 <unfinished ...>
[pid 126319] <... pread64
resumed>"\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784
[pid 126320] <... mmap resumed>)   = 0x7fac914ed000
[pid 126320] mmap(0x7fac91675000, 323584, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1b0000 <unfinished ...>
[pid 126319] mmap(NULL, 2170256, PROT_READ,
MAP_PRIVATE|MAP_DENYWRITE, 3, 0 <unfinished ...>
[pid 126320] <... mmap resumed>)   = 0x7fac91675000
[pid 126319] <... mmap resumed>)   = 0x7f7eb64e5000
[pid 126320] mmap(0x7fac916c4000, 24576, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1fe000 <unfinished ...>

[pid 126319] mmap(0x7f7eb650d000, 1605632, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000 <unfinished ...>
[pid 126320] <... mmap resumed>)   = 0x7fac916c4000
[pid 126319] <... mmap resumed>)   = 0x7f7eb650d000
[pid 126320] mmap(0x7fac916ca000, 52624, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 126319] mmap(0x7f7eb6695000, 323584, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1b0000 <unfinished ...>
[pid 126320] <... mmap resumed>)   = 0x7fac916ca000
[pid 126319] <... mmap resumed>)   = 0x7f7eb6695000
[pid 126320] close(3)   = 0
[pid 126319] mmap(0x7f7eb66e4000, 24576, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1fe000 <unfinished ...>
[pid 126320] mmap(NULL, 12288, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 126319] <... mmap resumed>)   = 0x7f7eb66e4000
[pid 126320] <... mmap resumed>)   = 0x7fac914c2000
[pid 126319] mmap(0x7f7eb66ea000, 52624, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 126320] arch_prctl(ARCH_SET_FS, 0x7fac914c2740 <unfinished ...>
[pid 126319] <... mmap resumed>)   = 0x7f7eb66ea000
[pid 126320] <... arch_prctl resumed>) = 0
[pid 126319] close(3 <unfinished ...>
[pid 126320] set_tid_address(0x7fac914c2a10 <unfinished ...>
[pid 126319] <... close resumed>)   = 0
[pid 126320] <... set_tid_address resumed>) = 126320
[pid 126319] mmap(NULL, 12288, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 126320] set_robust_list(0x7fac914c2a20, 24 <unfinished ...>
[pid 126319] <... mmap resumed>)   = 0x7f7eb64e2000
[pid 126320] <... set_robust_list resumed>) = 0
[pid 126319] arch_prctl(ARCH_SET_FS, 0x7f7eb64e2740 <unfinished ...>
[pid 126320] rseq(0x7fac914c3060, 0x20, 0, 0x53053053 <unfinished ...>
[pid 126319] <... arch_prctl resumed>) = 0
[pid 126320] <... rseq resumed>)   = 0
[pid 126319] set_tid_address(0x7f7eb64e2a10 <unfinished ...>
[pid 126320] mprotect(0x7fac916c4000, 16384, PROT_READ <unfinished ...>
[pid 126319] <... set_tid_address resumed>) = 126319
[pid 126320] <... mprotect resumed>)   = 0
[pid 126319] set_robust_list(0x7f7eb64e2a20, 24 <unfinished ...>
[pid 126320] mprotect(0x556b979ac000, 4096, PROT_READ <unfinished ...>
[pid 126319] <... set_robust_list resumed>) = 0
[pid 126320] <... mprotect resumed>)   = 0
[pid 126319] rseq(0x7f7eb64e3060, 0x20, 0, 0x53053053 <unfinished ...>
[pid 126320] mprotect(0x7fac91714000, 8192, PROT_READ <unfinished ...>
[pid 126319] <... rseq resumed>)   = 0
[pid 126320] <... mprotect resumed>)   = 0

[pid 126320] prlimit64(0, RLIMIT_STACK, NULL, <unfinished ...>
[pid 126319] mprotect(0x7f7eb66e4000, 16384, PROT_READ <unfinished ...>
[pid 126320] <... prlimit64 resumed>{rlim_cur=8192*1024,
rlim_max=RLIM64_INFINITY}) = 0
[pid 126319] <... mprotect resumed>)   = 0
[pid 126320] munmap(0x7fac916d7000, 19131 <unfinished ...>
[pid 126319] mprotect(0x555e9f442000, 4096, PROT_READ <unfinished ...>
[pid 126320] <... munmap resumed>)   = 0
[pid 126319] <... mprotect resumed>)   = 0
[pid 126320] getrandom("\x90\x20\x2e\xd2\x1f\xaf\xae\x3f", 8, GRND_NONBLOCK)
= 8
[pid 126320] brk(NULL)   = 0x556b9a4c3000
[pid 126320] brk(0x556b9a4e4000)   = 0x556b9a4e4000
[pid 126320] openat(AT_FDCWD, "f_2.txt", O_WRONLY|O_CREAT|O_TRUNC,
0666 <unfinished ...>
[pid 126319] mprotect(0x7f7eb6734000, 8192, PROT_READ) = 0
[pid 126319] prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024,
rlim_max=RLIM64_INFINITY}) = 0
[pid 126319] munmap(0x7f7eb66f7000, 19131) = 0
[pid 126319] getrandom("\xab\xf2\x19\x9a\xe4\xe7\x25\xd7", 8,
GRND_NONBLOCK) = 8
[pid 126319] brk(NULL)   = 0x555ea04cc000
[pid 126319] brk(0x555ea04ed000)   = 0x555ea04ed000
[pid 126319] openat(AT_FDCWD, "f_1.txt", O_WRONLY|O_CREAT|O_TRUNC,
0666 <unfinished ...>
[pid 126320] <... openat resumed>)   = 3
[pid 126320] fstat(0, {st_mode=S_IFIFO|0600, st_size=0, ...}) = 0
[pid 126320] read(0, <unfinished ...>
[pid 126319] <... openat resumed>)   = 3
[pid 126319] fstat(0, {st_mode=S_IFIFO|0600, st_size=0, ...}) = 0
[pid 126319] read(0, Hello World
 <unfinished ...>
[pid 126225] <... read resumed>"Hello World\n", 1024) = 12
[pid 126225] write(1,
"\320\236\321\202\320\277\321\200\320\260\320\262\320\273\320\265\320\275\320\276
\320\262 Child 1 "..., 62Отправлено в Child 1 (вероятность: 62%)
) = 62
[pid 126225] write(4, "Hello World\n", 12) = 12
[pid 126319] <... read resumed>"Hello World\n", 4096) = 12
[pid 126225] read(0, <unfinished ...>
[pid 126319] fstat(3, {st_mode=S_IFREG|0777, st_size=0, ...}) = 0
[pid 126319] read(0, Hi
 <unfinished ...>
[pid 126225] <... read resumed>"Hi\n", 1024) = 3
[pid 126225] write(1,
"\320\236\321\202\320\277\321\200\320\260\320\262\320\273\320\265\320\275\320\276
\320\262 Child 2 "..., 62Отправлено в Child 2 (вероятность: 97%)

```
) = 62
[pid 126225] write(6, "Hi\n", 3)        = 3
[pid 126320] <... read resumed>"Hi\n", 4096) = 3
[pid 126225] read(0, <unfinished ...>
[pid 126320] fstat(3, {st_mode=S_IFREG|0777, st_size=0, ...}) = 0
[pid 126320] read(0, QUIT
 <unfinished ...>
[pid 126225] <... read resumed>"QUIT\n", 1024) = 5
[pid 126225] close(4)                = 0
[pid 126319] <... read resumed>"", 4096) = 0
[pid 126225] close(6)                = 0
[pid 126320] <... read resumed>"", 4096) = 0
[pid 126319] write(3, "Hll Wrld\n", 9 <unfinished ...>
[pid 126225] wait4(126319, <unfinished ...>
[pid 126320] write(3, "H\n", 2 <unfinished ...>
[pid 126319] <... write resumed>)       = 9
[pid 126319] close(3 <unfinished ...>
[pid 126320] <... write resumed>)       = 2
[pid 126320] close(3)                 = 0
[pid 126319] <... close resumed>)       = 0
[pid 126320] exit_group(0 <unfinished ...>
[pid 126319] exit_group(0 <unfinished ...>
[pid 126320] <... exit_group resumed>)  = ?
[pid 126319] <... exit_group resumed>)  = ?
[pid 126320] +++ exited with 0 +++
[pid 126225] <... wait4 resumed>NULL, 0, NULL) = ? ERESTARTSYS (To be
restarted if SA_RESTART is set)
[pid 126225] --- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED,
si_pid=126320, si_uid=1000, si_status=0, si_utime=0, si_stime=0} ---
[pid 126225] wait4(126319, <unfinished ...>
[pid 126319] +++ exited with 0 +++
<... wait4 resumed>NULL, 0, NULL)       = 126319
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=126319,
si_uid=1000, si_status=0, si_utime=0, si_stime=0} ---
wait4(126320, NULL, 0, NULL)            = 126320
write(1,
"\320\240\320\276\320\264\320\270\321\202\320\265\320\273\321\214\321\201\320\272\32
0\270\320\271 \320\270 \320\264\320\265"..., 92Родительский и детский процесс
успешно завершены
) = 92
exit_group(0)                       = ?
+++ exited with 0 +++
```

Lab2
```
$ strace -f ./lab2_naive_search 4 "abacabaabacab" "aba"
execve("./lab2_naive_search", ["./lab2_naive_search", "4", "abacabaabacab", "aba"],
0x7fff7aca41d0 /* 35 vars */) = 0
```

```
brk(NULL)                        = 0x5569a1daa000
mmap(NULL, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f1989aff000
access("/etc/ld.so.preload", R_OK)      = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=19935, ...}) = 0
mmap(NULL, 19935, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f1989afa000
close(3)                         = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) =
3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\243\2\0\0\0\0\0"..., 832) =
832
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64)
= 784
fstat(3, {st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64)
= 784
mmap(NULL, 2170256, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f19898e8000
mmap(0x7f1989910000, 1605632, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000) = 0x7f1989910000
mmap(0x7f1989a98000, 323584, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1b0000) = 0x7f1989a98000
mmap(0x7f1989ae7000, 24576, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1fe000) = 0x7f1989ae7000
mmap(0x7f1989aed000, 52624, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f1989aed000
close(3)                         = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f19898e5000
arch_prctl(ARCH_SET_FS, 0x7f19898e5740) = 0
set_tid_address(0x7f19898e5a10)        = 210757
set_robust_list(0x7f19898e5a20, 24)     = 0
rseq(0x7f19898e6060, 0x20, 0, 0x53053053) = 0
mprotect(0x7f1989ae7000, 16384, PROT_READ) = 0
mprotect(0x55697c145000, 4096, PROT_READ) = 0
mprotect(0x7f1989b37000, 8192, PROT_READ) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024,
rlim_max=RLIM64_INFINITY}) = 0
munmap(0x7f1989afa000, 19935)          = 0
getrandom("\x51\xcd\x84\x02\x38\x64\x1b\x38", 8, GRND_NONBLOCK) = 8
brk(NULL)                        = 0x5569a1daa000
brk(0x5569a1dcb000)               = 0x5569a1dcb000
rt_sigaction(SIGRT_1, {sa_handler=0x7f1989981530, sa_mask=[],
sa_flags=SA_RESTORER|SA_ONSTACK|SA_RESTART|SA_SIGINFO,
sa_restorer=0x7f198992d330}, NULL, 8) = 0
rt_sigprocmask(SIG_UNBLOCK, [RTMIN RT_1], NULL, 8) = 0
```

mmap(NULL, 8392704, PROT_NONE,
MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) = 0x7f19890e4000
    mprotect(0x7f19890e5000, 8388608, PROT_READ|PROT_WRITE) = 0
    rt_sigprocmask(SIG_BLOCK, ~[], [], 8)   = 0
    **clone3({flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CL
ONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|
CLONE_CHILD_CLEARTID, child_tid=0x7f19898e4990, parent_tid=0x7f19898e4990,
exit_signal=0, stack=0x7f19890e4000, stack_size=0x7fff80, tls=0x7f19898e46c0}strace:
Process 210758 attached**
     => {parent_tid=[210758]}, 88) = 210758
    [pid 210758] rseq(0x7f19898e4fe0, 0x20, 0, 0x53053053 <unfinished ...>
    [pid 210757] rt_sigprocmask(SIG_SETMASK, [], <unfinished ...>
    [pid 210758] <... rseq resumed>)   = 0
    [pid 210757] <... rt_sigprocmask resumed>NULL, 8) = 0
    [pid 210758] set_robust_list(0x7f19898e49a0, 24 <unfinished ...>
    [pid 210757] mmap(NULL, 8392704, PROT_NONE,
MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0 <unfinished ...>
    [pid 210758] <... set_robust_list resumed>) = 0
    [pid 210757] <... mmap resumed>)   = 0x7f19888e3000
    [pid 210758] rt_sigprocmask(SIG_SETMASK, [], <unfinished ...>
    [pid 210757] mprotect(0x7f19888e4000, 8388608, PROT_READ|PROT_WRITE
<unfinished ...>
    [pid 210758] <... rt_sigprocmask resumed>NULL, 8) = 0
    [pid 210758] mmap(NULL, 134217728, PROT_NONE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0 <unfinished ...>
    [pid 210757] <... mprotect resumed>)   = 0
    [pid 210758] <... mmap resumed>)   = 0x7f19808e3000
    [pid 210757] rt_sigprocmask(SIG_BLOCK, ~[], <unfinished ...>
    [pid 210758] munmap(0x7f19808e3000, 57790464 <unfinished ...>
    [pid 210757] <... rt_sigprocmask resumed>[], 8) = 0
    [pid 210757]
**clone3({flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE
_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLO
NE_CHILD_CLEARTID, child_tid=0x7f19890e3990, parent_tid=0x7f19890e3990,
exit_signal=0, stack=0x7f19888e3000, stack_size=0x7fff80, tls=0x7f19890e36c0}
<unfinished ...>**
    [pid 210758] <... munmap resumed>)   = 0
    [pid 210758] munmap(0x7f1988000000, 9318400strace: Process 210759 attached
     <unfinished ...>
    [pid 210757] <... clone3 resumed> => {parent_tid=[210759]}, 88) = 210759
    [pid 210758] <... munmap resumed>)   = 0
    [pid 210757] rt_sigprocmask(SIG_SETMASK, [], <unfinished ...>
    [pid 210759] rseq(0x7f19890e3fe0, 0x20, 0, 0x53053053 <unfinished ...>
    [pid 210757] <... rt_sigprocmask resumed>NULL, 8) = 0
    [pid 210758] mprotect(0x7f1984000000, 135168, PROT_READ|PROT_WRITE
<unfinished ...>

[pid 210757] mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0 <unfinished ...>
[pid 210759] <... rseq resumed>)   = 0
[pid 210757] <... mmap resumed>)   = 0x7f19880e2000
[pid 210758] <... mprotect resumed>)   = 0
[pid 210757] mprotect(0x7f19880e3000, 8388608, PROT_READ|PROT_WRITE <unfinished ...>
[pid 210759] set_robust_list(0x7f19890e39a0, 24 <unfinished ...>
[pid 210757] <... mprotect resumed>)   = 0
[pid 210759] <... set_robust_list resumed>) = 0
[pid 210758] rt_sigprocmask(SIG_BLOCK, ~[RT_1], <unfinished ...>
[pid 210757] rt_sigprocmask(SIG_BLOCK, ~[], <unfinished ...>
[pid 210759] rt_sigprocmask(SIG_SETMASK, [], <unfinished ...>
[pid 210757] <... rt_sigprocmask resumed>[], 8) = 0
[pid 210758] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid 210757]
clone3({flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID, child_tid=0x7f19888e2990, parent_tid=0x7f19888e2990, exit_signal=0, stack=0x7f19880e2000, stack_size=0x7fff80, tls=0x7f19888e26c0} <unfinished ...>
[pid 210759] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid 210758] madvise(0x7f19890e4000, 8368128, MADV_DONTNEED <unfinished ...>
[pid 210759] rt_sigprocmask(SIG_BLOCK, ~[RT_1], <unfinished ...>
[pid 210758] <... madvise resumed>)   = 0
strace: Process 210760 attached
[pid 210757] <... clone3 resumed> => {parent_tid=[210760]}, 88) = 210760
[pid 210759] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid 210758] exit(0 <unfinished ...>
[pid 210757] rt_sigprocmask(SIG_SETMASK, [], <unfinished ...>
[pid 210760] rseq(0x7f19888e2fe0, 0x20, 0, 0x53053053 <unfinished ...>
[pid 210759] madvise(0x7f19888e3000, 8368128, MADV_DONTNEED <unfinished ...>
[pid 210757] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid 210760] <... rseq resumed>)   = 0
[pid 210758] <... exit resumed>)   = ?
[pid 210757] mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0 <unfinished ...>
[pid 210760] set_robust_list(0x7f19888e29a0, 24 <unfinished ...>
[pid 210759] <... madvise resumed>)   = 0
[pid 210760] <... set_robust_list resumed>) = 0
[pid 210758] +++ exited with 0 +++
[pid 210759] exit(0 <unfinished ...>
[pid 210757] <... mmap resumed>)   = 0x7f19837ff000
[pid 210760] rt_sigprocmask(SIG_SETMASK, [], <unfinished ...>

[pid 210757] mprotect(0x7f1983800000, 8388608, PROT_READ|PROT_WRITE <unfinished ...>
[pid 210759] <... exit resumed>)   = ?
[pid 210757] <... mprotect resumed>)   = 0
[pid 210760] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid 210759] +++ exited with 0 +++
[pid 210760] rt_sigprocmask(SIG_BLOCK, ~[RT_1], NULL, 8) = 0
[pid 210760] madvise(0x7f19880e2000, 8368128, MADV_DONTNEED) = 0
[pid 210760] exit(0)   = ?
[pid 210760] +++ exited with 0 +++
rt_sigprocmask(SIG_BLOCK, ~[], [], 8)   = 0
clone3({flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID, child_tid=0x7f1983fff990, parent_tid=0x7f1983fff990, exit_signal=0, stack=0x7f19837ff000, stack_size=0x7fff80, tls=0x7f1983fff6c0}strace: Process 210761 attached
 => {parent_tid=[210761]}, 88) = 210761
[pid 210761] rseq(0x7f1983ffffe0, 0x20, 0, 0x53053053) = 0
[pid 210757] rt_sigprocmask(SIG_SETMASK, [], <unfinished ...>
[pid 210761] set_robust_list(0x7f1983fff9a0, 24 <unfinished ...>
[pid 210757] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid 210761] <... set_robust_list resumed>) = 0
[pid 210757] **futex(0x7f1983fff990, FUTEX_WAIT_BITSET|FUTEX_CLOCK_REALTIME, 210761, NULL, FUTEX_BITSET_MATCH_ANY <unfinished ...>**
[pid 210761] rt_sigprocmask(SIG_SETMASK, [], NULL, 8) = 0
[pid 210761] rt_sigprocmask(SIG_BLOCK, ~[RT_1], NULL, 8) = 0
[pid 210761] madvise(0x7f19837ff000, 8368128, MADV_DONTNEED) = 0
[pid 210761] exit(0)   = ?
[pid 210757] <... futex resumed>)   = 0
[pid 210761] +++ exited with 0 +++
fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x7), ...}) = 0
write(1, "Found: 3\n", 9Found: 3
)   = 9
write(1, "0 4 7 \n", 70 4 7
)   = 7
write(1, "Time: 0.003325 seconds\n", 23Time: 0.003325 seconds
) = 23
write(1, "Threads used: 4 (max: 4)\n", 25Threads used: 4 (max: 4)
) = 25
getpid()   = 210757
write(1, "Process PID: 210757\n", 20Process PID: 210757
)   = 20
exit_group(0)   = ?
+++ exited with 0 +++

Lab3

```
$ strace -f ./parent
execve("./parent", ["./parent"], 0x7ffd39e00de8 /* 38 vars */) = 0
brk(NULL)                               = 0x56178f248000
mmap(NULL, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7efe2e7f8000
access("/etc/ld.so.preload", R_OK)      = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=37779, ...}) = 0
mmap(NULL, 37779, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7efe2e7ee000
close(3)                                = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6",
O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\243\2\0\0\0\0\0"..., 832) =
832
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64)
= 784
fstat(3, {st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64)
= 784
mmap(NULL, 2170256, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3,
0) = 0x7efe2e5dc000
mmap(0x7efe2e604000, 1605632, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000) = 0x7efe2e604000
mmap(0x7efe2e78c000, 323584, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1b0000) = 0x7efe2e78c000
mmap(0x7efe2e7db000, 24576, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1fe000) = 0x7efe2e7db000
mmap(0x7efe2e7e1000, 52624, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7efe2e7e1000
close(3)                                = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7efe2e5d9000
arch_prctl(ARCH_SET_FS, 0x7efe2e5d9740) = 0
set_tid_address(0x7efe2e5d9a10)         = 23939
set_robust_list(0x7efe2e5d9a20, 24)     = 0
rseq(0x7efe2e5da060, 0x20, 0, 0x53053053) = 0
mprotect(0x7efe2e7db000, 16384, PROT_READ) = 0
mprotect(0x5617626d9000, 4096, PROT_READ) = 0
mprotect(0x7efe2e830000, 8192, PROT_READ) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024,
rlim_max=RLIM64_INFINITY}) = 0
munmap(0x7efe2e7ee000, 37779)           = 0
fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x5), ...}) = 0
getrandom("\x1e\x5c\x17\xd4\x98\x68\xdc\x5d", 8, GRND_NONBLOCK) = 8
brk(NULL)                               = 0x56178f248000
brk(0x56178f269000)                     = 0x56178f269000
fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x5), ...}) = 0
```

write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265\320\270\320\274\321\217 shared mem"..., 51Введите имя shared memory для child1:) = 51

read(0, /shmm1
"/shmm1\n", 1024)   = 7

write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265\320\270\320\274\321\217 \321\204\320\260\320\271\320\273\320\260"..., 61Введите имя файла вывода для child1:) = 61

read(0, ff1.txt
"ff1.txt\n", 1024)   = 8

write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265\320\270\320\274\321\217 shared mem"..., 51Введите имя shared memory для child2:) = 51

read(0, /shmm2
"/shmm2\n", 1024)   = 7

write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265\320\270\320\274\321\217 \321\204\320\260\320\271\320\273\320\260"..., 61Введите имя файла вывода для child2:) = 61

read(0, ff2.txt
"ff2.txt\n", 1024)   = 8

**openat(AT_FDCWD, "/dev/shm/shmm1",
O_RDWR|O_CREAT|O_NOFOLLOW|O_CLOEXEC, 0666) = 3**

ftruncate(3, 1032)   = 0

**openat(AT_FDCWD, "/dev/shm/shmm2",
O_RDWR|O_CREAT|O_NOFOLLOW|O_CLOEXEC, 0666) = 4**

ftruncate(4, 1032)   = 0

**mmap(NULL, 1032, PROT_READ|PROT_WRITE, MAP_SHARED, 3, 0) =
0x7efe2e7f7000**

**mmap(NULL, 1032, PROT_READ|PROT_WRITE, MAP_SHARED, 4, 0) =
0x7efe2e7f6000**

**clone(child_stack=NULL,
flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLDstrace:
Process 24163 attached**

, child_tidptr=0x7efe2e5d9a10) = 24163

[pid 24163] set_robust_list(0x7efe2e5d9a20, 24 <unfinished ...>

**[pid 23939] clone(child_stack=NULL,
flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD
<unfinished ...>**

[pid 24163] <... set_robust_list resumed>) = 0

strace: Process 24164 attached

**[pid 24163] execve("./child", ["child", "/shmm1", "ff1.txt"], 0x7ffd2f880438 /* 38
vars */ <unfinished ...>**

[pid 23939] <... clone resumed>, child_tidptr=0x7efe2e5d9a10) = 24164

[pid 24164] set_robust_list(0x7efe2e5d9a20, 24 <unfinished ...>

[pid 23939] write(1,
"\320\240\320\276\320\264\320\270\321\202\320\265\320\273\321\214\321\201\320\272\320\270\320\271 \320\277\321\200\320\276\321"..., 55 <unfinished ...>

Родительский процесс начался

[pid 24164] <... set_robust_list resumed>) = 0

[pid 23939] <... write resumed>) = 55

[pid 24164] execve("./child", ["child", "/shmm2", "ff2.txt"], 0x7ffd2f880438 /* 38 vars */ <unfinished ...>

[pid 23939] write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265 \321\201\321\202\321\200\320\276\320\272\320\270 (\320\264\320"..., 71Введите строки (для выхода введите QUIT):
) = 71

[pid 23939] read(0, <unfinished ...>

[pid 24163] <... execve resumed>) = 0

[pid 24163] brk(NULL) = 0x5601e8af3000

[pid 24164] <... execve resumed>) = 0

[pid 24164] brk(NULL <unfinished ...>

[pid 24163] mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0 <unfinished ...>

[pid 24164] <... brk resumed>) = 0x55cddcb2b000

[pid 24163] <... mmap resumed>) = 0x7f6ae0457000

[pid 24163] access("/etc/ld.so.preload", R_OK <unfinished ...>

[pid 24164] mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0 <unfinished ...>

[pid 24163] <... access resumed>) = -1 ENOENT (No such file or directory)

[pid 24164] <... mmap resumed>) = 0x7f31ccfa7000

[pid 24163] openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC <unfinished ...>

[pid 24164] access("/etc/ld.so.preload", R_OK <unfinished ...>

[pid 24163] <... openat resumed>) = 3

[pid 24164] <... access resumed>) = -1 ENOENT (No such file or directory)

[pid 24163] fstat(3, <unfinished ...>

[pid 24164] openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC <unfinished ...>

[pid 24163] <... fstat resumed>{st_mode=S_IFREG|0644, st_size=37779, ...}) = 0

[pid 24164] <... openat resumed>) = 3

[pid 24163] mmap(NULL, 37779, PROT_READ, MAP_PRIVATE, 3, 0 <unfinished ...>

[pid 24164] fstat(3, <unfinished ...>

[pid 24163] <... mmap resumed>) = 0x7f6ae044d000

[pid 24164] <... fstat resumed>{st_mode=S_IFREG|0644, st_size=37779, ...}) = 0

[pid 24163] close(3 <unfinished ...>

[pid 24164] mmap(NULL, 37779, PROT_READ, MAP_PRIVATE, 3, 0 <unfinished ...>

[pid 24163] <... close resumed>) = 0

[pid 24164] <... mmap resumed>) = 0x7f31ccf9d000

[pid 24163] openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC <unfinished ...>

[pid 24164] close(3 <unfinished ...>

[pid 24163] <... openat resumed>) = 3

[pid 24164] <... close resumed>)   = 0
[pid 24163] read(3, <unfinished ...>
[pid 24164] openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6",
O_RDONLY|O_CLOEXEC <unfinished ...>
[pid 24163] <... read
resumed>"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\243\2\0\0\0\0\0"..., 832) =
832
[pid 24164] <... openat resumed>)   = 3
[pid 24163] pread64(3, <unfinished ...>
[pid 24164] read(3, <unfinished ...>
[pid 24163] <... pread64
resumed>"\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784
[pid 24164] <... read
resumed>"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\243\2\0\0\0\0\0"..., 832) =
832
[pid 24163] fstat(3, <unfinished ...>
[pid 24164] pread64(3, <unfinished ...>
[pid 24163] <... fstat resumed>{st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0
[pid 24164] <... pread64
resumed>"\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784
[pid 24163] pread64(3, <unfinished ...>
[pid 24164] fstat(3, <unfinished ...>
[pid 24163] <... pread64
resumed>"\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784
[pid 24164] <... fstat resumed>{st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0
[pid 24163] mmap(NULL, 2170256, PROT_READ,
MAP_PRIVATE|MAP_DENYWRITE, 3, 0 <unfinished ...>
[pid 24164] pread64(3, <unfinished ...>
[pid 24163] <... mmap resumed>)   = 0x7f6ae023b000
[pid 24164] <... pread64
resumed>"\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784
[pid 24163] mmap(0x7f6ae0263000, 1605632, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000 <unfinished ...>
[pid 24164] mmap(NULL, 2170256, PROT_READ,
MAP_PRIVATE|MAP_DENYWRITE, 3, 0 <unfinished ...>
[pid 24163] <... mmap resumed>)   = 0x7f6ae0263000
[pid 24164] <... mmap resumed>)   = 0x7f31ccd8b000
[pid 24163] mmap(0x7f6ae03eb000, 323584, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1b0000 <unfinished ...>
[pid 24164] mmap(0x7f31ccdb3000, 1605632, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000 <unfinished ...>
[pid 24163] <... mmap resumed>)   = 0x7f6ae03eb000
[pid 24164] <... mmap resumed>)   = 0x7f31ccdb3000
[pid 24163] mmap(0x7f6ae043a000, 24576, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1fe000 <unfinished ...>
[pid 24164] mmap(0x7f31ccf3b000, 323584, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1b0000) = 0x7f31ccf3b000

[pid 24163] <... mmap resumed>)   = 0x7f6ae043a000
[pid 24164] mmap(0x7f31ccf8a000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1fe000 <unfinished ...>
[pid 24163] mmap(0x7f6ae0440000, 52624, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 24164] <... mmap resumed>)   = 0x7f31ccf8a000
[pid 24163] <... mmap resumed>)   = 0x7f6ae0440000
[pid 24164] mmap(0x7f31ccf90000, 52624, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 24163] close(3)   = 0
[pid 24164] <... mmap resumed>)   = 0x7f31ccf90000
[pid 24163] mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 24164] close(3 <unfinished ...>
[pid 24163] <... mmap resumed>)   = 0x7f6ae0238000
[pid 24164] <... close resumed>)   = 0
[pid 24163] arch_prctl(ARCH_SET_FS, 0x7f6ae0238740 <unfinished ...>
[pid 24164] mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 24163] <... arch_prctl resumed>)   = 0
[pid 24164] <... mmap resumed>)   = 0x7f31ccd88000
[pid 24163] set_tid_address(0x7f6ae0238a10 <unfinished ...>
[pid 24164] arch_prctl(ARCH_SET_FS, 0x7f31ccd88740 <unfinished ...>
[pid 24163] <... set_tid_address resumed>) = 24163
[pid 24164] <... arch_prctl resumed>)   = 0
[pid 24163] set_robust_list(0x7f6ae0238a20, 24 <unfinished ...>
[pid 24164] set_tid_address(0x7f31ccd88a10 <unfinished ...>
[pid 24163] <... set_robust_list resumed>) = 0
[pid 24164] <... set_tid_address resumed>) = 24164
[pid 24163] rseq(0x7f6ae0239060, 0x20, 0, 0x53053053 <unfinished ...>
[pid 24164] set_robust_list(0x7f31ccd88a20, 24 <unfinished ...>
[pid 24163] <... rseq resumed>)   = 0
[pid 24164] <... set_robust_list resumed>) = 0
[pid 24163] mprotect(0x7f6ae043a000, 16384, PROT_READ <unfinished ...>
[pid 24164] rseq(0x7f31ccd89060, 0x20, 0, 0x53053053 <unfinished ...>
[pid 24163] <... mprotect resumed>)   = 0
[pid 24164] <... rseq resumed>)   = 0
[pid 24163] mprotect(0x5601be10c000, 4096, PROT_READ) = 0
[pid 24164] mprotect(0x7f31ccf8a000, 16384, PROT_READ <unfinished ...>
[pid 24163] mprotect(0x7f6ae048f000, 8192, PROT_READ) = 0
[pid 24164] <... mprotect resumed>)   = 0
[pid 24163] prlimit64(0, RLIMIT_STACK, NULL, <unfinished ...>
[pid 24164] mprotect(0x55cdd3e53000, 4096, PROT_READ <unfinished ...>
[pid 24163] <... prlimit64 resumed>{rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0
[pid 24164] <... mprotect resumed>)   = 0
[pid 24163] munmap(0x7f6ae044d000, 37779 <unfinished ...>

[pid 24164] mprotect(0x7f31ccfdf000, 8192, PROT_READ <unfinished ...>
[pid 24163] <... munmap resumed>)   = 0
[pid 24164] <... mprotect resumed>)   = 0
[pid 24163] openat(AT_FDCWD, "/dev/shm/shmm1",
O_RDWR|O_NOFOLLOW|O_CLOEXEC <unfinished ...>
[pid 24164] prlimit64(0, RLIMIT_STACK, NULL, <unfinished ...>
[pid 24163] <... openat resumed>)   = 3
[pid 24164] <... prlimit64 resumed>{rlim_cur=8192*1024,
rlim_max=RLIM64_INFINITY}) = 0
**[pid 24163] mmap(NULL, 1032, PROT_READ|PROT_WRITE, MAP_SHARED,
3, 0 <unfinished ...>**
[pid 24164] munmap(0x7f31ccf9d000, 37779 <unfinished ...>
[pid 24163] <... mmap resumed>)   = 0x7f6ae0456000
[pid 24164] <... munmap resumed>)   = 0
[pid 24163] getrandom(<unfinished ...>
[pid 24164] openat(AT_FDCWD, "/dev/shm/shmm2",
O_RDWR|O_NOFOLLOW|O_CLOEXEC <unfinished ...>
[pid 24163] <... getrandom resumed>"\xc2\xda\x1f\x4f\x92\xb1\x0b\x66", 8,
GRND_NONBLOCK) = 8
[pid 24164] <... openat resumed>)   = 3
[pid 24163] brk(NULL <unfinished ...>
[pid 24164] mmap(NULL, 1032, PROT_READ|PROT_WRITE, MAP_SHARED, 3, 0
<unfinished ...>
[pid 24163] <... brk resumed>)   = 0x5601e8af3000
[pid 24164] <... mmap resumed>)   = 0x7f31ccfa6000
[pid 24163] brk(0x5601e8b14000 <unfinished ...>
[pid 24164] getrandom(<unfinished ...>
[pid 24163] <... brk resumed>)   = 0x5601e8b14000
[pid 24164] <... getrandom resumed>"\x48\xc6\xc9\xb1\x56\x88\xf3\x81", 8,
GRND_NONBLOCK) = 8
[pid 24163] openat(AT_FDCWD, "ff1.txt", O_WRONLY|O_CREAT|O_TRUNC, 0666
<unfinished ...>
[pid 24164] brk(NULL)   = 0x55cddcb2b000
[pid 24164] brk(0x55cddcb4c000)   = 0x55cddcb4c000
[pid 24164] openat(AT_FDCWD, "ff2.txt", O_WRONLY|O_CREAT|O_TRUNC, 0666
<unfinished ...>
[pid 24163] <... openat resumed>)   = 4
[pid 24163] fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x5), ...}) = 0
[pid 24163] write(1,
"\320\224\320\276\321\207\320\265\321\200\320\275\320\270\320\271
\320\277\321\200\320\276\321\206\320\265\321\201\321\201 "..., 87Дочерний процесс
начал работу (SHM: /shmm1, Output: ff1.txt)
) = 87
[pid 24164] <... openat resumed>)   = 4
[pid 24164] fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x5), ...}) = 0
[pid 24164] write(1,
"\320\224\320\276\321\207\320\265\321\200\320\275\320\270\320\271

\320\277\321\200\320\276\321\206\320\265\321\201\321\201 "..., 87Дочерний процесс начал работу (SHM: /shmm2, Output: ff2.txt)

) = 87

[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] <... read resumed>0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)

[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] read(0, <unfinished ...>

[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] <... read resumed>0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)

[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] read(0, <unfinished ...>

[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] <... read resumed>0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)

[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] read(0, <unfinished ...>

[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] <... read resumed>0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)

[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] read(0, 0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)

[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] read(0, <unfinished ...>

[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] <... read resumed>0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)

[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] read(0, <unfinished ...>

[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] <... read resumed>0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)

[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

[pid 23939] read(0, <unfinished ...>
[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] <... read resumed>0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] read(0, <unfinished ...>
[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] <... read resumed>0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] read(0, 0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] read(0, <unfinished ...>
[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] <... read resumed>0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] read(0, <unfinished ...>
[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] <... read resumed>0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] read(0, 0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] read(0, <unfinished ...>
[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] <... read resumed>0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] read(0, <unfinished ...>
[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] <... read resumed>0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] read(0, <unfinished ...>

[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] <... read resumed>0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] read(0, <unfinished ...>
[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] <... read resumed>0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] read(0, <unfinished ...>
[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] <... read resumed>0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] read(0, <unfinished ...>
[pid 24164] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] <... read resumed>0x56178f2486b0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
[pid 24163] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
[pid 23939] read(0, Hello world
"Hello world\n", 1024) = 12
[pid 23939] write(1,
"\320\236\321\202\320\277\321\200\320\260\320\262\320\273\320\265\320\275\320\276\320\262 Child1 ("..., 61Отправлено в Child1 (вероятность: 30%)
) = 61
[pid 24163] fstat(4, {st_mode=S_IFREG|0777, st_size=0, ...}) = 0
[pid 24163] write(4, "Hll wrld\n", 9)   = 9
[pid 23939] read(0, Programming
"Programming\n", 1024) = 12
[pid 23939] write(1,
"\320\236\321\202\320\277\321\200\320\260\320\262\320\273\320\265\320\275\320\276\320\262 Child1 ("..., 61Отправлено в Child1 (вероятность: 49%)
) = 61
[pid 24163] write(4, "Prgrmmng\n", 9)   = 9
[pid 23939] read(0, Yes
"Yes\n", 1024)   = 4
[pid 23939] write(1,
"\320\236\321\202\320\277\321\200\320\260\320\262\320\273\320\265\320\275\320\276\320\262 Child1 ("..., 61Отправлено в Child1 (вероятность: 74%)
) = 61
[pid 24163] write(4, "s\n", 2)   = 2
[pid 23939] read(0, Nooooope
"Nooooope\n", 1024) = 9

[pid 23939] write(1,
"\320\236\321\202\320\277\321\200\320\260\320\262\320\273\320\265\320\275\320\276
\320\262 Child1 ("..., 61Отправлено в Child1 (вероятность: 21%)
) = 61
[pid 24163] write(4, "Np\n", 3)   = 3
[pid 23939] read(0, Asssss
"Asssss\n", 1024)   = 7
[pid 23939] write(1,
"\320\236\321\202\320\277\321\200\320\260\320\262\320\273\320\265\320\275\320\276
\320\262 Child1 ("..., 60Отправлено в Child1 (вероятность: 9%)
) = 60
[pid 24163] write(4, "sssss\n", 6)   = 6
[pid 23939] read(0, QUIT
"QUIT\n", 1024)   = 5
[pid 23939] wait4(24163, <unfinished ...>
[pid 24164] write(1,
"\320\224\320\276\321\207\320\265\321\200\320\275\320\270\320\271
\320\277\321\200\320\276\321\206\320\265\321\201\321\201 "..., 62 <unfinished ...>
[pid 24163] write(1,
"\320\224\320\276\321\207\320\265\321\200\320\275\320\270\320\271
\320\277\321\200\320\276\321\206\320\265\321\201\321\201 "..., 62Дочерний процесс
завершил работу
Дочерний процесс завершил работу
 <unfinished ...>
[pid 24164] <... write resumed>)   = 62
[pid 24163] <... write resumed>)   = 62
[pid 24164] close(4 <unfinished ...>
[pid 24163] close(4 <unfinished ...>
[pid 24164] <... close resumed>)   = 0
[pid 24164] munmap(0x7f31ccfa6000, 1032) = 0
[pid 24164] close(3 <unfinished ...>
[pid 24163] <... close resumed>)   = 0
[pid 24164] <... close resumed>)   = 0
[pid 24163] munmap(0x7f6ae0456000, 1032 <unfinished ...>
[pid 24164] exit_group(0 <unfinished ...>
[pid 24163] <... munmap resumed>)   = 0
[pid 24163] close(3 <unfinished ...>
[pid 24164] <... exit_group resumed>)   = ?
[pid 24163] <... close resumed>)   = 0
[pid 24163] exit_group(0)   = ?
[pid 24164] +++ exited with 0 +++
[pid 23939] <... wait4 resumed>NULL, 0, NULL) = ? ERESTARTSYS (To be restarted
if SA_RESTART is set)
[pid 23939] --- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED,
si_pid=24164, si_uid=1000, si_status=0, si_utime=5967 /* 59.67 s */, si_stime=1 /* 0.01 s
*/} ---
[pid 23939] wait4(24163, <unfinished ...>

```
[pid 24163] +++ exited with 0 +++
<... wait4 resumed>NULL, 0, NULL)       = 24163
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=24163,
si_uid=1000, si_status=0, si_utime=5967 /* 59.67 s */, si_stime=1 /* 0.01 s */} ---
wait4(24164, NULL, 0, NULL)            = 24164
write(1,
"\320\240\320\276\320\264\320\270\321\202\320\265\320\273\321\214\321\201\320\272\320\270\320\271 \320\270 \320\264\320\276"..., 96Родительский и дочерние процессы
успешно завершены
) = 96
munmap(0x7efe2e7f7000, 1032)           = 0
munmap(0x7efe2e7f6000, 1032)           = 0
close(3)                               = 0
unlink("/dev/shm/shmm1")               = 0
close(4)                               = 0
unlink("/dev/shm/shmm2")               = 0
exit_group(0)                          = ?
+++ exited with 0 +++
```

Lab4
Prog1_static.c
  $ strace ./bin/prog1_static

```
execve("./bin/prog1_static", ["./bin/prog1_static"], 0x7ffd62165d60 /* 37 vars */) =
0

brk(NULL)                       = 0x55bdeb976000

mmap(NULL, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f199b57f000

access("/etc/ld.so.preload", R_OK)     = -1 ENOENT (No such file or directory)

openat(AT_FDCWD, "./bin/glibc-hwcaps/x86-64-v3/libtranslation_bin.so",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

openat(AT_FDCWD, "./bin/glibc-hwcaps/x86-64-v2/libtranslation_bin.so",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

openat(AT_FDCWD, "./bin/libtranslation_bin.so",
O_RDONLY|O_CLOEXEC) = 3

read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0\0"..., 832) =
832

fstat(3, {st_mode=S_IFREG|0777, st_size=15584, ...}) = 0

getcwd("/mnt/d/Programming/OS/lab4", 128) = 27

mmap(NULL, 16424, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3,
0) = 0x7f199b57a000
```

mmap(0x7f199b57b000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1000) = 0x7f199b57b000

mmap(0x7f199b57c000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f199b57c000

mmap(0x7f199b57d000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f199b57d000

close(3)   = 0

openat(AT_FDCWD, "./bin/glibc-hwcaps/x86-64-v3/libsort_bubble.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

openat(AT_FDCWD, "./bin/glibc-hwcaps/x86-64-v2/libsort_bubble.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

openat(AT_FDCWD, "./bin/libsort_bubble.so", O_RDONLY|O_CLOEXEC) = 3

read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0\0"..., 832) = 832

fstat(3, {st_mode=S_IFREG|0777, st_size=15144, ...}) = 0

getcwd("/mnt/d/Programming/OS/lab4", 128) = 27

mmap(NULL, 16400, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f199b575000

mmap(0x7f199b576000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1000) = 0x7f199b576000

mmap(0x7f199b577000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f199b577000

mmap(0x7f199b578000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f199b578000

close(3)   = 0

openat(AT_FDCWD, "./bin/glibc-hwcaps/x86-64-v3/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

openat(AT_FDCWD, "./bin/glibc-hwcaps/x86-64-v2/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

openat(AT_FDCWD, "./bin/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3

fstat(3, {st_mode=S_IFREG|0644, st_size=37779, ...}) = 0

mmap(NULL, 37779, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f199b56b000

close(3)   = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3

read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\243\2\0\0\0\0\0"..., 832) = 832

pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784

fstat(3, {st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0

pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784

mmap(NULL, 2170256, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f199b359000

mmap(0x7f199b381000, 1605632, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000) = 0x7f199b381000

mmap(0x7f199b509000, 323584, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1b0000) = 0x7f199b509000

mmap(0x7f199b558000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1fe000) = 0x7f199b558000

mmap(0x7f199b55e000, 52624, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f199b55e000

close(3)   = 0

mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f199b356000

arch_prctl(ARCH_SET_FS, 0x7f199b356740) = 0

set_tid_address(0x7f199b356a10)   = 17237

set_robust_list(0x7f199b356a20, 24)   = 0

rseq(0x7f199b357060, 0x20, 0, 0x53053053) = 0

mprotect(0x7f199b558000, 16384, PROT_READ) = 0

mprotect(0x7f199b578000, 4096, PROT_READ) = 0

mprotect(0x7f199b57d000, 4096, PROT_READ) = 0

mprotect(0x55bdb495b000, 4096, PROT_READ) = 0

mprotect(0x7f199b5b7000, 8192, PROT_READ) = 0

prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0

munmap(0x7f199b56b000, 37779)   = 0

write(1, "\320\237\321\200\320\276\320\263\321\200\320\260\320\274\320\274\320\260 1: \320\241\321\202\320\260\321\202\320\270"..., 62Программа 1: Статическая линковка

) = 62

write(1, "\320\244\321\203\320\275\320\272\321\206\320\270\321\217 1: \320\237\320\265\321\200\320\265\320\262\320\276\320\264"..., 87Функция 1: Перевод в двоичную систему счисления

) = 87

write(1, "\320\244\321\203\320\275\320\272\321\206\320\270\321\217 2: \320\237\321\203\320\267\321\213\321\200\321\214\320\272"..., 62Функция 2: Пузырьковая сортировка

) = 62

write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265 \320\272\320\276\320\274\320\260\320\275\320\264\321\203: ("..., 114Введите команду: (1 [число] или 2 [массив чисел] или 'q' для выхода)

) = 114

read(0, 1 34

"1 34\n", 511)   = 5

getrandom("\xf7\xac\x02\x3f\x73\x4b\xf2\x24", 8, GRND_NONBLOCK) = 8

brk(NULL)   = 0x55bdeb976000

brk(0x55bdeb997000)   = 0x55bdeb997000

write(1, "\320\240\320\265\320\267\321\203\320\273\321\214\321\202\320\260\321\202 (\320\264\320\262\320\276\320\270\321\207\320\275"..., 39Результат (двоичный):) = 39

write(1, "100010", 6100010)   = 6

write(1, "\n", 1

)   = 1

write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265 \320\272\320\276\320\274\320\260\320\275\320\264\321\203: ("..., 114Введите команду: (1 [число] или 2 [массив чисел] или 'q' для выхода)

) = 114

read(0, 2 3 2 8 5 4

"2 3 2 8 5 4\n", 511)   = 12

write(1, "\320\230\321\201\321\205\320\276\320\264\320\275\321\213\320\271
\320\274\320\260\321\201\321\201\320\270\320\262: ", 31Исходный массив:) = 31

write(1, "3", 13)   = 1

write(1, " ", 1)   = 1

write(1, "2", 12)   = 1

write(1, " ", 1)   = 1

write(1, "8", 18)   = 1

write(1, " ", 1)   = 1

write(1, "5", 15)   = 1

write(1, " ", 1)   = 1

write(1, "4", 14)   = 1

write(1, " ", 1)   = 1

write(1, "\n", 1

)   = 1

write(1,
"\320\240\320\265\320\267\321\203\320\273\321\214\321\202\320\260\321\202
(\320\237\321\203\320\267\321\213\321\200\321\214"..., 45Результат (Пузырьковая):)
= 45

write(1, "2", 12)   = 1

write(1, " ", 1)   = 1

write(1, "3", 13)   = 1

write(1, " ", 1)   = 1

write(1, "4", 14)   = 1

write(1, " ", 1)   = 1

write(1, "5", 15)   = 1

write(1, " ", 1)   = 1

write(1, "8", 18)   = 1

write(1, " ", 1)   = 1

write(1, "\n", 1

)   = 1

write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265
\320\272\320\276\320\274\320\260\320\275\320\264\321\203: ("..., 114Введите
команду: (1 [число] или 2 [массив чисел] или 'q' для выхода)

) = 114

read(0, q

"q\n", 511)   = 2

exit_group(0)   = ?

+++ exited with 0 +++

prog2_dynamic.c
$ strace -f ./bin/prog2_dynamic

execve("./bin/prog2_dynamic", ["./bin/prog2_dynamic"], 0x7ffea3ddf8d8 /* 37 vars
*/) = 0

brk(NULL)   = 0x555b28d2b000

**mmap(NULL, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f14de96a000**

access("/etc/ld.so.preload", R_OK)   = -1 ENOENT (No such file or directory)

openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3

fstat(3, {st_mode=S_IFREG|0644, st_size=37779, ...}) = 0

mmap(NULL, 37779, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f14de960000

close(3)   = 0

**openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6",
O_RDONLY|O_CLOEXEC) = 3**

read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\243\2\0\0\0\0\0"..., 832)
= 832

pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784,
64) = 784

fstat(3, {st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0

pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784,
64) = 784

**mmap(NULL, 2170256, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE,
3, 0) = 0x7f14de74e000**

mmap(0x7f14de776000, 1605632, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000) = 0x7f14de776000

mmap(0x7f14de8fe000, 323584, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1b0000) = 0x7f14de8fe000

mmap(0x7f14de94d000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1fe000) = 0x7f14de94d000

mmap(0x7f14de953000, 52624, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f14de953000

close(3)   = 0

mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f14de74b000

arch_prctl(ARCH_SET_FS, 0x7f14de74b740) = 0

set_tid_address(0x7f14de74ba10)   = 16194

set_robust_list(0x7f14de74ba20, 24)   = 0

rseq(0x7f14de74c060, 0x20, 0, 0x53053053) = 0

mprotect(0x7f14de94d000, 16384, PROT_READ) = 0

mprotect(0x555af7a9f000, 4096, PROT_READ) = 0

mprotect(0x7f14de9a2000, 8192, PROT_READ) = 0

prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0

munmap(0x7f14de960000, 37779)   = 0

getrandom("\x20\xfd\x32\xf8\xef\x19\xcb\x87", 8, GRND_NONBLOCK) = 8

brk(NULL)   = 0x555b28d2b000

brk(0x555b28d4c000)   = 0x555b28d4c000

openat(AT_FDCWD, "bin/libtranslation_bin.so", O_RDONLY|O_CLOEXEC) = 3

read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0\0"..., 832) = 832

fstat(3, {st_mode=S_IFREG|0777, st_size=15584, ...}) = 0

getcwd("/mnt/d/Programming/OS/lab4", 128) = 27

mmap(NULL, 16424, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f14de965000

mmap(0x7f14de966000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1000) = 0x7f14de966000

mmap(0x7f14de967000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f14de967000

mmap(0x7f14de968000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f14de968000

close(3)   = 0

mprotect(0x7f14de968000, 4096, PROT_READ) = 0

openat(AT_FDCWD, "bin/libtranslation_ter.so", O_RDONLY|O_CLOEXEC) = 3

read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0\0"..., 832) = 832

fstat(3, {st_mode=S_IFREG|0777, st_size=15584, ...}) = 0

getcwd("/mnt/d/Programming/OS/lab4", 128) = 27

mmap(NULL, 16424, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f14de960000

mmap(0x7f14de961000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1000) = 0x7f14de961000

mmap(0x7f14de962000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f14de962000

mmap(0x7f14de963000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f14de963000

close(3)   = 0

mprotect(0x7f14de963000, 4096, PROT_READ) = 0

openat(AT_FDCWD, "bin/libsort_bubble.so", O_RDONLY|O_CLOEXEC) = 3

read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0\0"..., 832) = 832

fstat(3, {st_mode=S_IFREG|0777, st_size=15144, ...}) = 0

getcwd("/mnt/d/Programming/OS/lab4", 128) = 27

mmap(NULL, 16400, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f14de746000

mmap(0x7f14de747000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1000) = 0x7f14de747000

mmap(0x7f14de748000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f14de748000

mmap(0x7f14de749000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f14de749000

close(3)   = 0

mprotect(0x7f14de749000, 4096, PROT_READ) = 0

openat(AT_FDCWD, "bin/libsort_quick.so", O_RDONLY|O_CLOEXEC) = 3

read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0"..., 832) = 832

fstat(3, {st_mode=S_IFREG|0777, st_size=15256, ...}) = 0

getcwd("/mnt/d/Programming/OS/lab4", 128) = 27

mmap(NULL, 16400, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f14de741000

mmap(0x7f14de742000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1000) = 0x7f14de742000

mmap(0x7f14de743000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f14de743000

mmap(0x7f14de744000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f14de744000

close(3)   = 0

mprotect(0x7f14de744000, 4096, PROT_READ) = 0

write(1, "---
\320\237\321\200\320\276\320\263\321\200\320\260\320\274\320\274\320\260 2:
\320\224\320\270\320\275"..., 72--- Программа 2: Динамическая загрузка ---

) = 72

write(1,
"\320\235\320\260\321\207\320\260\320\273\321\214\320\275\321\213\320\265
\321\200\320\265\320\260\320\273\320\270\320\267\320"..., 95Начальные реализации:
Ф1 - Двоичная, Ф2 - Пузырьковая.

) = 95

write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265
\320\272\320\276\320\274\320\260\320\275\320\264\321\203 (0"..., 121Введите
команду (0 - переключить, 1 [число], 2 [массив чисел], q - выход):

) = 121

read(0, 0x7ffcb5d39f40, 511)   = ? ERESTARTSYS (To be restarted if SA_RESTART is set)

    --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

    read(0, 1 15

    "1 15\n", 511)   = 5

    write(1,
"\320\240\320\265\320\267\321\203\320\273\321\214\321\202\320\260\321\202
(\320\224\320\262\320\276\320\270\321\207\320\275"..., 44Результат (Двоичный):
1111

) = 44

    write(1, "\n\320\222\320\262\320\265\320\264\320\270\321\202\320\265
\320\272\320\276\320\274\320\260\320\275\320\264\321\203: ", 32

    Введите команду:) = 32

    read(0, 0

    "0\n", 511)   = 2

    write(1, "---
\320\240\320\225\320\220\320\233\320\230\320\227\320\220\320\246\320\230\320\230
\320\237\320\225\320\240\320"..., 52--- РЕАЛИЗАЦИИ ПЕРЕКЛЮЧЕНЫ ---

) = 52

    write(1, "\320\244\321\203\320\275\320\272\321\206\320\270\321\217 1:
\320\242\321\200\320\276\320\270\321\207\320\275\320\260"..., 40Функция 1:
Троичная (V2)

) = 40

    write(1, "\320\244\321\203\320\275\320\272\321\206\320\270\321\217 2:
\320\245\320\276\320\260\321\200\320\260 (V2"..., 34Функция 2: Хоара (V2)

) = 34

    write(1, "\n\320\222\320\262\320\265\320\264\320\270\321\202\320\265
\320\272\320\276\320\274\320\260\320\275\320\264\321\203: ", 32

    Введите команду:) = 32

    read(0, 1 54

    "1 54\n", 511)   = 5

    write(1,
"\320\240\320\265\320\267\321\203\320\273\321\214\321\202\320\260\321\202
(\320\242\321\200\320\276\320\270\321\207\320\275"..., 44Результат (Троичный):
2000

) = 44

write(1, "\n\320\222\320\262\320\265\320\264\320\270\321\202\320\265
\320\272\320\276\320\274\320\260\320\275\320\264\321\203: ", 32

Введите команду:) = 32

read(0, q

"q\n", 511)   = 2

munmap(0x7f14de965000, 16424)   = 0

munmap(0x7f14de960000, 16424)   = 0

munmap(0x7f14de746000, 16400)   = 0

munmap(0x7f14de741000, 16400)   = 0

exit_group(0)   = ?

+++ exited with 0 +++

(P. S. В выводе strace нет системного вызова переключения реализаций функций, так как все библиотеки загружаются при запуске программы через openat(), это видно в начале strace:

openat(AT_FDCWD, "bin/libtranslation_bin.so", ...)
openat(AT_FDCWD, "bin/libtranslation_ter.so", ...)
openat(AT_FDCWD, "bin/libsort_bubble.so", ...)
openat(AT_FDCWD, "bin/libsort_quick.so", ...)

А переключение реализаций – это просто смена указателей в памяти с помощью dlsym(), которая ищет уже загруженные функции.)

Вывод

В ходе лабораторной работы №5 с использованием утилиты strace был проведен анализ системных вызовов, выполняемых программами из предыдущих лабораторных работ. Анализ показал, как конструкции языка Си (создание процессов, работа с каналами, разделяемой памятью, потоками и динамическими библиотеками) преобразуются в низкоуровневые запросы к ядру ОС — clone, pipe2, mmap, openat, munmap и другие.

Проверка подтвердила правильность реализации механизмов межпроцессного взаимодействия и управления ресурсами во всех программах. Также были выявлены характерные шаблоны использования системных вызовов для различных способов коммуникации (каналы, разделяемая память) и организации многозадачности (процессы и потоки).